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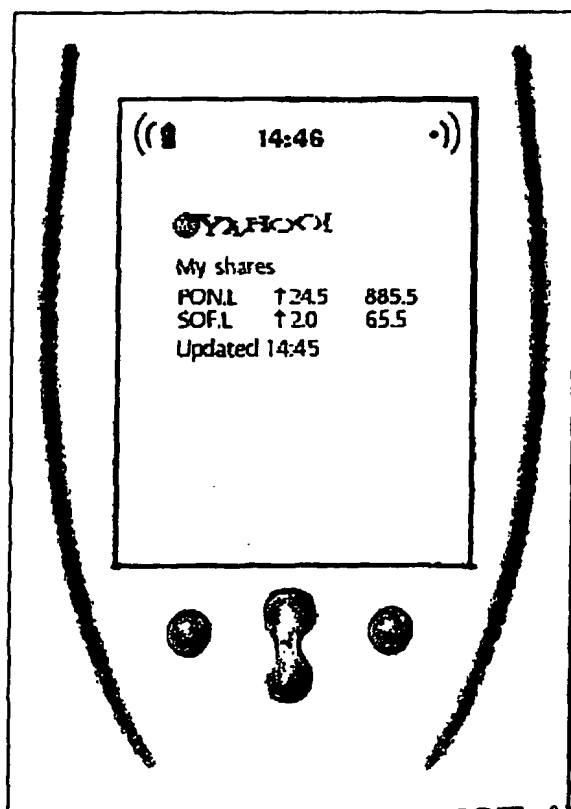
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(54) Title: **MOBILE TELEPHONE DEVICE WITH IDLE SCREEN**



(57) **Abstract:** The idle screen of a mobile telephone device is used to show updated information of a kind or from a source selected by a user (e.g. financial information, news, traffic etc.). Previously, the idle screen has been used to display the name of the network operator and alerting messages, such as "2 missed calls". Placing information of interest to the user in the idle screen makes that information instantly accessible without the user having to navigate to the required function (e.g. a micro-browser) and select it.

WO 02/052815 A2

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## MOBILE TELEPHONE DEVICE WITH IDLE SCREEN

### BACKGROUND TO THE INVENTION

#### 1. Field of the Invention

5 This invention relates to a mobile telephone device with an idle screen. The term 'mobile telephone device' refers to any kind of small screen (e.g. A5 size or less) portable electronic device with voice communications capabilities, including radio telephones, smart phones, communicators and wireless information devices. The term 'idle screen' refers to the default screen displayed when the mobile telephone device is  
10 switched on and therefore capable of receiving a voice call. The idle screen is the screen which is displayed when the user is not navigating to a particular function, nor actively using a particular application, such as a contacts application, or a messaging application. Personal computers have no equivalent to an idle screen.

15

#### 2. Description of the Prior Art

One of the problems facing the designers of mobile telephone devices is how to allow the user to access data and activate a desired function. Conventionally, the small display size (i.e. under A5 size) associated with a mobile telephone device has meant that functions need to  
20 be layered into multiple hierarchies: the interface can be thought of as having many layers, with the user having to first locate the correct top level function and then, within that function, progressively drill down (sometimes through 3 or more layers) to reach the target function. Finally, the user has to select an appropriate option to actually complete the required task. Navigating through multiple levels and performing numerous selections of  
25 various options can be both confusing and tedious for a user; often used functions can be rendered inconveniently inaccessible.

As an example, many mobile telephone devices now have internet WAP access to retrieve information from remote information sources; a WAP micro-browser currently typically  
30 enables simplified, text only WAP pages or 'cards' to be viewed. Reading WAP information

on a mobile telephone device typically involves however the following multi-stage navigation process: (i) turn the client device on; (ii) view an idle screen; (iii) navigate from the idle screen to open the appropriate application (e.g. a micro-browser); (iv) select the required resource (e.g. open a particular WAP page); (v) enter a password and username; (vi) select the required information; (vii) wait for the download; and finally (viii) view the required information. This process is sufficiently slow and complicated to be unattractive to many users, especially the non-computer literate users to whom mobile telephone devices are particularly aimed.

Various attempts at improving menu accessibility by making more efficient use of the available screen 'real estate' have been proposed. For example, EP 891066 to Nokia Mobile Phones Ltd teaches the approach of placing the most used functions in a mobile telephone into a particular menu list of the most commonly used functions. Hence, a user has to navigate first to the menu list of the most used functions, then select from within that list the required function. This saves the user having to navigate through potentially many more layers of the menu system to find and select the required function.

It will be appreciated that the field of Personal Computer ('PC') user interaction design is non-analogous to mobile telephone device user interaction design because a PC has a far larger screen size; hence, multiple application windows or their associated icons can be simultaneously displayed. Navigating between these windows/icons is generally a straightforward process of moving a mouse controlled cursor to the applicable window/icon. The user interaction designer working in the mobile telephone field however has a far more constraining environment to work within because of the very limited screen size. Another reason why mobile telephone device user interaction design is fundamentally different from that of PC user interaction design is that there is no equivalent to the idle screen in a PC.

Although the closest PC arts are non-analogous for the reasons given above, we note for completeness that in the PC domain, it is known to have a customisable web browser bar that a user can program to show information of interest to that user (e.g. a news ticker; a stock quote ticker etc.). But even here, a user still needs to (i) turn the client device on; (ii) view a start up screen; and (iii) progress from the start-up screen to open the browser application. If the browser has a permanent internet connection, a user may keep the browser application open, with the browser bar visible somewhere in the PC screen or readily selectable. But invariably the bulk of the screen will be occupied not with the small browser bar (with user selected information categories) but with one or more windows running applications (e.g. a word processing application etc.), exploiting the large screen size.

Reference may also be made to Phone.com EP 1043905, which shows using the idle screen of a mobile telephone to display adverts and other information selected and sent by the network provider, but not information of a kind selected by the user. Geoworks WO 00/77979 shows using a mobile telephone to display adverts, but not on an idle screen and not information of a kind selected by the user. Hence, this prior art fails to show the idea of using the idle screen to display updated (e.g. WAP pulled) information of a kind selected by the user.

On a more theoretical basis, an effective user interface enables the user to comprehend the changing internal status of the mobile telephone device as navigation proceeds. For example, to select or initiate a function (e.g. to open an address book function, enter a PIN security number or to alter the ring melody) a user has to understand (a) how to navigate to that function in order to select that function and (b) that the status of the telephone is such that the function can be selected or initiated. The technical problem of effectively enabling the internal state of the mobile telephone device to enable a user to view information from a remote resource without having to perform multiple navigation steps has to date been inadequately addressed.

## SUMMARY OF THE PRESENT INVENTION

According to the invention, there is provided a mobile telephone device, the device being adapted to display, as part or all of an idle screen, updated information which is (a) defined by a user of the device to be of a kind which is of interest to him or her  
5 and is (b) supplied to the device from a remote information resource.

Hence, the fundamental insight of this invention is to use the idle screen of the mobile telephone device to show updated information obtained from a remote information source, in which the information is of a kind selected by the user (and not by an advertiser or network operator, as in the closest prior art). The information can be  
10 content such as financial information, news, traffic etc pushed from the network operator. The information may also be from a resource selected by a user (e.g. from a particular internet portal which the user selects; specific kinds of content from that portal will also usually also be selected). A 'remote information resource' contains  
15 information of interest to a potentially large number of users and is remotely accessible over a wireless connection. Web and WAP sites are examples of remote information resources.

Previously, the idle screen has primarily been used solely to display the name of the network operator and alerting messages, such as '2 missed calls', or other kinds of  
20 information selected, not by the user, but by an advertiser or network operator. Placing remotely sourced, updated information of interest to the user in the idle screen makes that information instantly accessible without the user having to navigate to the required application (e.g. a micro-browser), open that application (which may require a  
25 username and password) navigate to the required information and wait for it to download.

The value of the idle screen as a piece of screen 'real estate', immediately visible to a user, has not been capitalised on previously. By making the idle screen an intrinsically  
30 interesting and very frequently viewed screen, its value as a sponsorship and

advertising platform is greatly enhanced. Hence, the sale of advertising and sponsor message occupancy on the idle screen is possible.

5 In one implementation, the remote information resource providing the content is an internet site, such as, but not limited to, a WAP site. Hyperlinks in the updated information shown in the idle screen can be navigated to. In addition to WAP content in WML format, content may also be provided by messages, including smart messages such as BioMessages™ from Symbian Limited of the United Kingdom.

10 The user may directly select the remote information resource by, for example, navigating to an internet site and defining elements of that site to appear in the idle screen. The user may also indirectly select the remote information resource by setting or agreeing to certain kinds of default profiles; for example, if a user selects a 'shopping' profile, then location specific information relating to nearby shops (e.g. 15 special offers etc.) or links to nearby taxi firms or indeed nearby taxis could be pushed to the user's device to appear automatically in the idle screen of the user's mobile telephone device.

20 Preferably, alerting messages (e.g. "1 missed call") are displayed in addition to the updated information or alternating, possibly every few seconds, with that updated information.

Additional features may include the following:

- 25 • The user being able to select the frequency or schedule of updated information; Updates can also be sent whenever a change to the content occurs. Having information pushed to the device in these ways means that the information shown on the idle screen is always reasonably up to date and the user does not need to wait for a download whenever he or she wishes to view reasonably current information.

- Multiple information resources may be used with different priority settings; for example the idle screen may normally simply show information from a general news feed, but when a local traffic alert is issued, that can take priority over the general news information and be displayed in its place or together with the general news feed.

5

In another aspect of the invention, there is a method of supplying information for display on a mobile telephone device, comprising the step of sending from a remote information resource updated information defined by a user of the device to be of a kind which is of interest to him or her, in which the information is subsequently displayed on an idle screen of the device.

10

A further aspect of the invention is a remote information resource adapted to be suitable for supplying information as defined in the method of supplying information defined in the preceding paragraph.

15

Another aspect of the invention is computer software suitable for enabling a mobile telephone device to:

- (i) retrieve or receive, from a remote information resource, information defined by a user of the device to be of a kind which is of interest to him or her;
- (ii) display that information on an idle screen of the device.

20

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described with reference to the accompanying drawings, in  
5 which:

Figures 1 – 4 are screen shots showing how a web site can be accessed to set  
up automatic updating of information to a mobile telephone device as envisaged in the  
present invention;

10 Figures 5 – 10B are schematic images showing a mobile telephone device with  
screen showing the various stages involved in using a system envisaged in the present  
invention.

Figures 11A and 11B are schematic flow charts of a WAP/Web pull  
implementation;

15 Figures 12A and 12B are schematic flow charts of a WAP push  
implementation;

Figures 13A and 13B are schematic flow charts of a message based  
implementation.

## 20 DETAILED DESCRIPTION

The present invention will be described with reference to an implementation called  
Active Idle™ from Symbian Limited of the United Kingdom; Active Idle allows a user  
to select WAP derived data to be pushed to his or her mobile telephone device and  
25 displayed as the idle screen, or as part of the idle screen. Active Idle can also be used  
not only for WAP but also 2.5G and 3G systems.

WAP is often sold on its ability to deliver a specific type of commodity: small chunks  
of frequently-changing information, such as sports scores, stock prices, flight status  
30 bulletins, cinema listings, news, weather forecasts, etc. As noted above, it is



unfortunate therefore that getting at this information should conventionally require the user to delve through menus, open an application, enter a username and password and wait for a download.

5 With Active Idle, mobile telephone devices support embedding a scheduled-update WAP page, or content delivered via smart messages (such as Bio Messages), within the default or idle screen. Active Idle therefore provides user-selected key information at a glance, without requiring user actions, and without interrupting the user with alerts.

10 There are two main elements to setting up the idle screen in Active Idle:  
**Selecting the information itself.** While the user could select an existing WAP page as the idle screen, formatting problems, ad-junk, and the fact that the user might want information from disparate sources means that a customised page would typically be better. Portal companies like Yahoo!, AvantGo, mViva, MSN etc. may therefore allow tailoring of content  
15 to an appropriate format. Tailoring content would also involve setting the update schedules.

**Setting the page as the idle screen.** This could be done either by the user specifying a URL on the device, or via smart message setup.

The information delivery and display then practically runs itself, with only optional  
20 interventions from the user.

### **Example**

This example shows how the availability of an Active Idle screen might be exploited by Yahoo!™ over WAP: the service is called the Y! mobile Agent. The illustrated  
25 implementation is hypothetical only and should not be construed as implying that any such service is in fact available from or otherwise supported by Yahoo!.

1. The user logs into My Yahoo! on his/her PC as shown in **Figure 1**. Configuration could also be done via the mobile telephone device. For brevity, the term 'mobile telephone device' may be shortened to 'device' in this specification.
- 5 2. The user selects the option for setting up the Yahoo! mobile agent, as shown in **Figure 2**
3. A setup screen informed by the user's existing My Yahoo! preferences allows the user to specify what is visible in the 'agent' or idle page, as shown in **Figure 3**.
- 10 4. The user selects 'My shares' and 'My scoreboard', sets the update schedules and presses 'Finished' as shown in **Figure 4**.

15 If the delivery mechanism is WAP, pressing 'Finished' sends a smart message to the user's mobile telephone device which will configure it to set the appropriate URL as the idle page.

If the delivery mechanism is smart messages, pressing 'Finished' simply initiates the first sending of data.

- 20 5. The user receives the message on his/her mobile telephone device(s) as shown in **Figure 5**.
6. The user applies the settings as shown in **Figure 6**.
- 25 7. Various processes are carried out and then the user gets the first delivery, as shown in **Figure 7**.

The content includes branding elements. Apart from displaying the content, the device functions exactly as before.

8. The update schedule is every 20 minutes, but the user can force an update at any time by using the device menu as shown in **Figure 8A**, with an updated result being shown at **Figure 8B**.
- 5 9. On match days, the soccer scoreboard component becomes active, as shown in **Figure 9**. Updates could be pushed whenever there is a change.
10. If the content list is too long for the display area, the up and down arrow keys can be used even when the keypad lock is on as shown in **Figure 10A** and **Figure 10B**.
- 10 This would require the device to ignore the keypress once an extremity of the list is reached, to prevent powerdrain if e.g. a key is pressed in a bag.

Many other mechanisms are possible; in the following sections, we describe implementations for:

- 15 - WAP/Web pull  
- WAP Push  
- Other message-based system, such as BIOmessages.

20 These implementations are built using the Symbian OS™ platform from Symbian Limited of the United Kingdom. The Symbian OS platform is widely used for applications for mobile telephone devices. Software development kits and other development resources are readily available for the Symbian platform (see [symbian.com](http://symbian.com)).

### 1. WAP/Web 'pull' model

- 25 This section describes the components, overall flow, and detailed flow of the updating process for the WAP/Web 'pull' model. This is where the content displayed as part of Active Idle is a normal Web or Wap page which is 'pulled' by the device at times dictated by an update schedule and then displayed in the idle screen.

**Components:**

**User interaction components:** those parts of the device software and hardware which allow user input and interaction (e.g. touchscreen controls, menus and buttons; hardware buttons; device keypads etc.).

- 5    **Idle Screen Application (ISA):** this is the application or collection of software components which controls the idle screen as a whole (including any other functionality beyond Active Idle and other information displayed etc.). The details of how this application component works are beyond the scope of this document.

**Device screen:** the device hardware apparatus for displaying information.

- 10   **Timer & Schedule Manager (TSM):** this component stores information about the update schedule set by the user, and operates a timer service based on this schedule information which counts down until the next update is due.

- 15   **Active Idle Screen Manager (AISM):** This component acts on input from the user and the TSM to initiate updates of the Active Idle screen content, commissions downloads of content from the DDCCs (see below), stores downloaded content, and passes downloaded content to the Idle Screen Application.

- 20   **Device data communications components (DDCCs):** software and hardware components in the device pertaining to establishing data calls and data connections with remote devices, maintaining those calls and connections, exchanging data with remote devices across those connections, and closing calls and connections. These components also store information about user identity and password(s) for dial-in services. The details of how these components work in themselves are beyond the scope of this document.

**Content provider server:** the content provider server storing the content.

25   **Overall flow:**

1.    The user contacts content provider using the device (typically through Web or WAP browser software) and determines content s/he desires to be shown in the idle

screen. This could be an existing web or, more appropriately on a small screen, WAP page (such as wap.yahoo.co.uk). Or alternatively it could be a Web/WAP page generated according to the user's specified preferences for different sorts of information (e.g. sports results, cookery, news headlines). Services such as My Yahoo! Already offer this functionality for Web browsers.

- 5       2.     The user instructs the device to set the current page as the Active Idle screen page, and sets the update schedule (e.g. 'Update every hour', or 'Update at 9am').
3.     The device displays the page content in the idle screen.
- 10     Further updates of this content take place by the device automatically connecting to the server and retrieving the content according to the user's chosen schedule.

#### **Mechanisms involved in an update:**

- 15     1.     An update can be initiated by either:
  - a.   the user instructing the device to update now, by using controls (e.g. a menu option) on the device. (This kind of update could be called "Forced update".)
  - b.   the TSM instructing the AISM that it is time to update the content.
2.     Once an update is initiated, the AISM instructs the Device Data Communications  
20     Components to initiate a connection to the server and retrieve the content associated with the page address stored by the AISM.
3.     The DDCCs retrieve the appropriate content and return it to the AISM.
4.     The AISM stores the content and passes it to the Idle Screen Application specifying  
25     that the old content should be disregarded and the new content should be displayed in the Idle screen.
5.     The Idle Screen Application displays the content.

The flow and mechanism are illustrated schematically in **Figures 11A and 11B.**

## 2. WAP-push model

This section describes the components, overall flow, and detailed flow of the updating process for an Active Idle screen based on a system using WAP 'push'.

5

### Components:

**Idle Screen Application (ISA):** this is the application or collection of software components which controls the idle screen as a whole (including any other functionality beyond Active Idle and other information displayed such as battery strength etc.). The details of how this application component works are beyond the scope of this document.

**Device screen:** the device hardware apparatus for displaying information.

**Active Idle Screen Manager (AISM):** This component acts on input from the Message watcher, stores downloaded content, and passes downloaded content to the Idle Screen Application.

**Push message watcher:** a component which watches for push messages coming onto the device and processes them.

**Device data communications components (DDCCs):** software and hardware components in the device pertaining to establishing data calls and data connections with remote devices, maintaining those calls and connections, exchanging data with remote devices across those connections, and closing calls and connections. These components also store information about user identity and password(s) for dial-in services. The details of how these components work in themselves are beyond the scope of this document.

**Trusted services database:** a list of servers from whom 'push' content is accepted.

**Content provider server:** the content provider server sending the content.

**Flow and mechanism:**

1. User contacts content provider using the device (typically through a Wap browser software on the device), and determines content s/he desires to be shown in the idle screen (e.g. by 'subscribing' to a page, site or information service and specifying that this should be displayed in the device idle screen).  
5
2. As part of the user's selection on the content provider's site, the user optionally sets the update schedule (e.g. 'Update every hour', or 'Update at 9am' for news of prices of the user's share holdings).
3. The server then sends messages to the device identified as a 'push notification' message type informing the device that there is new content waiting for download.  
10
4. The Push message watcher checks that the message comes from a server the user has 'subscribed' to. If it does, it instructs the device communications components to initiate a connection and retrieve the new content from the content provider server.
5. The content is then passed to the Active Idle screen manager, which then passes it to the Idle screen application for incorporation within the display.  
15

The flow and mechanism are illustrated schematically in **Figures 12A and 12B.**

**3. Message-based model**

- 20 This section describes the components, overall flow, and detailed flow of the updating process for an Active Idle screen based on a system of messages being sent to the device.

**Components:**

- 25 **Idle Screen Application (ISA):** this is the application or collection of software components which controls the idle screen as a whole (including any other functionality beyond Active Idle and other information displayed etc.). The details of how this application component works are beyond the scope of this document.

**Device screen:** the device hardware apparatus for displaying information.

**Active Idle Screen Manager (AISM):** This component acts on input from the Message watcher, stores downloaded content, and passes downloaded content to the Idle Screen Application.

- 5    **Message watcher:** a component which identifies the 'type' of each message coming onto the device by standard message transports and processes it accordingly.

**Device data communications components (DDCCs):** software and hardware components in the device pertaining to establishing data calls and data connections with remote devices, maintaining those calls and connections, exchanging data with remote  
10    devices across those connections, and closing calls and connections. These components also store information about user identity and password(s) for dial-in services. The details of how these components work in themselves are beyond the scope of this document.

**Content provider server:** the content provider server sending the content.

15

**Flow and mechanism:**

1.    User contacts content provider using the device (typically through Web or Wap browser software) or another means (e.g. through a browser on a desktop computer), and determines content s/he desires to be shown in the idle screen. This could  
20    typically be by ticking boxes to indicate interests at a large content site such as www.bbc.co.uk. Many information service providers (e.g. FT.com) already provide services which deliver messages over SMS containing user-selected content (such as share price news).
2.    As part of the user's configuration on the content provider's site, the user sets the  
25    update schedule (e.g. 'Update every hour', or 'Update at 9am' for news prices of the user's share holdings).
3.    The server then sends messages to the device identified as an 'Active Idle' message type, containing the content.



4. The Message watcher recognises the message as containing content for display in the idle screen and passes the message to the Active Idle Screen Manager.
5. The content is then passed to the Idle screen application for incorporation within the display.

5

Note that this is not a secure model, since any message of the right type will be displayed in the device idle screen. A secure version could be implemented, where a key is given to the content provider to be used to identify itself as a trusted content provider. Messages without the key would be ignored, and the user could revoke the key at any time to remove the

10

The flow and mechanism are illustrated schematically in Figures 13A and 13B.

#### Extensions of concept

15 The following are extensions to the Active Idle implementation:

- Links could be incorporated in the page. They would be opened by, for example, selecting (via scroll control) and using a menu command or pressing 'the device's Send' key.
- 20 • A large amount of content could be delivered and displayed via a 'self-scrolling loop', like a vertically scrolling ticker on the page.
- Services could provide information based on the user's locale. This could mean, for example, that the user *always* had a link for a local taxi firm available on the device idle screen.
- 25 • Implementing this using a message-based system would allow companies currently supplying information via SMS to do so in a way that was less intrusive to the users.

- If the user is playing a multi-player game on the mobile telephone device, then game status and move information could be included in the idle screen;
- If the mobile telephone device is also a music download platform (e.g. downloads from mp3 music sites or is a digital radio receiver), then information in the idle screen can relate to the currently played music track (e.g. artist information, track information, concert dates, links to e-commerce functionality such as buying CDs).
- The information in the idle screen can also be location specific information, where the device is displaying information available about, or even (say, via radio communication such as Bluetooth) available in, the user's local environment. Examples include the following:
  - Timetable information at train stations or airports
  - Information on historic monuments or museum exhibits the user is standing near
  - Where nearby devices (such as security doors, printers etc.) display password screens on the user's device to allow access
  - Where the device is a multimedia terminal and the area of the idle screen is used to display listings of available 'channels' which can be opened up.

**CLAIMS**

1. A mobile telephone device, the device being adapted to display, as part or all of  
5 an idle screen, updated information which is (a) defined by a user of the device to be  
of a kind which is of interest to him or her and is (b) supplied to the device from a  
remote information resource.
2. The mobile telephone device of Claim 1 in which the information is from a  
10 source selected by a user.
3. The mobile telephone device of Claim 1 or 2 in which advertising and/or  
sponsor messages are also displayed on the idle screen.
- 15 4. The mobile telephone device of any preceding Claim in which the remote  
information resource providing the content is an internet site.
5. The mobile telephone device of Claim 4 in which there are hyperlinks in the  
updated information shown in the idle screen which can be navigated to and selected  
20 by the user.
6. The mobile telephone device of any preceding Claim in which the remote  
information resource provides the information of interest via smart message type  
objects.  
25
7. The mobile telephone device of any preceding Claim in which alerting messages  
are displayed in addition to the updated information or alternating with that updated  
information.

8. The mobile telephone device of any preceding Claim in which the user is able to select the frequency or schedule of updated information.

5 9. The mobile telephone device of any preceding Claim in which multiple information resources are used with different priority settings.

10. The mobile telephone device of any preceding Claim in which the updated information relates to one or more of the following:

- 10 (a) financial information;
- (b) sports information;
- (c) news information;
- (d) traffic information;
- (e) weather information;
- (e) status and/or moves of a multi-player game;
- 15 (f) music information; and
- (g) a music track downloaded or received by the device.

20 11. A method of supplying information for display on a mobile telephone device, comprising the step of sending from a remote information resource updated information defined by a user of the device to be of a kind which is of interest to him or her, in which the information is subsequently displayed on an idle screen of the device.

25 12. The method of Claim 11 in which the device is a device as claimed in any preceding Claim 1 – 10.

13. A remote information resource adapted to be suitable for supplying information as defined in the method of any preceding Claim 11 – 12.

30 14. Computer software suitable for enabling a mobile telephone device to:

- (i) retrieve or receive, from a remote information resource, information defined by a user of the device to be of a kind which is of interest to him or her;
- (ii) display that information on an idle screen of the device.

- 5 15. The computer software of Claim 14 in which the device is a device as claimed in any preceding Claim 1 – 10.

The screenshot shows a Yahoo! web page with a navigation bar at the top containing icons for back, forward, home, and search. The main content is divided into several sections:

- Portfolios**: A table titled "My shares" listing stock prices and changes.
 

Symbol	Price	Change
PON.L	798.00	-12.00
VOD.L	273.00	-11.00
ARM.L	753.00	-25.00
FTSE.L	N/A	N/A
UKXL	6544.30	-56.40
- Scoreboard**: A section titled "TODAY" with the text "no games for selected teams".
- Y! mobile**: A section titled "Set up Y! mobile agent for your mobile phone".
- New Page Headlines**: A section titled "UK: Top Stories" with a timestamp of "11 Sep 11:56AM". It lists two headlines: "Britain reviews security in S.Leone after raid" and "Fuel pumps run dry on 'panic buying'".
- UK: Business**: A section listing three headlines: "OPEC deal eases oil price, consumers still fret", "U.S. scrutiny forces new Glaxo, SB merger delay", and "Early FTSE bloodied by Vodafone, drugs, recovers".
- UK: Football**: A section listing two headlines: "McNamara full of praise for Sutton" and "Advocaat concerned over lapses".

The Yahoo! logo is visible in the bottom right corner of the page.

Figure 1

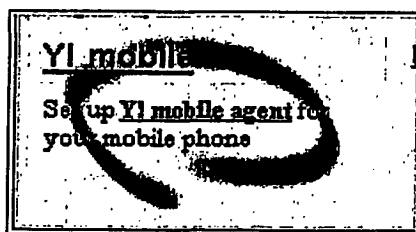


Figure 2

2/13

**YI mobile agent preferences**

Select the items to be shown in your YI mobile agent.

☒ **My shares** **Edit** update every 20 minutes

☐ **My scoreboard** **Edit**

☐ **UK headlines**

☐ **Business headlines**

☐ **Local weather** **Edit**

**Change Display Order** **Finished**

**YI mobile agent preview**

12:00 800 YI

YI  
SOF.L 55.5 (UP 2.5)  
NMK.L 129 (UP 2.3)

Figure 3

☐ **Business headlines**

☐ **Local weather** **Edit**

**Change Display Order** **Finished**

Figure 4

3/13

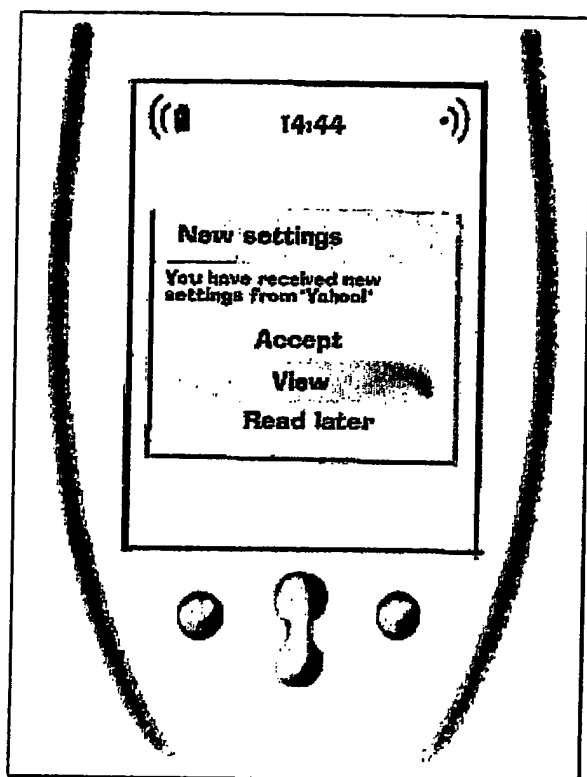


Figure 5



4/13

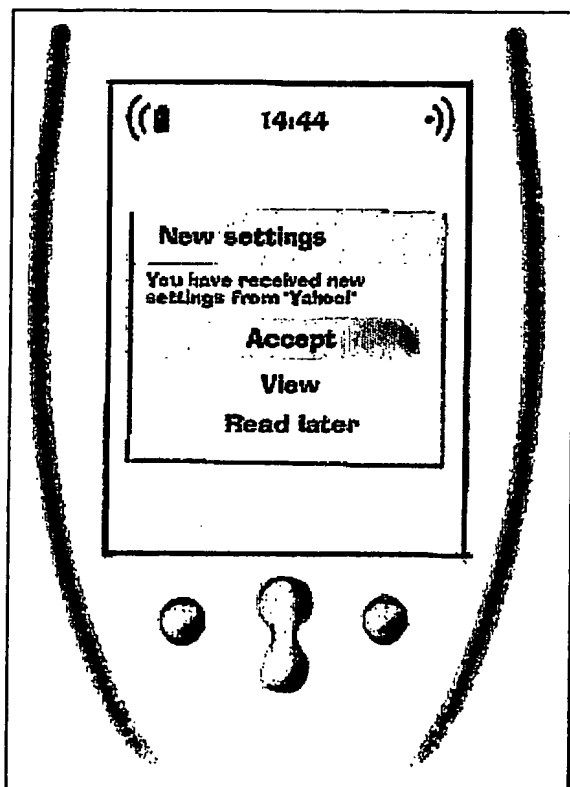


Figure 6

5/13

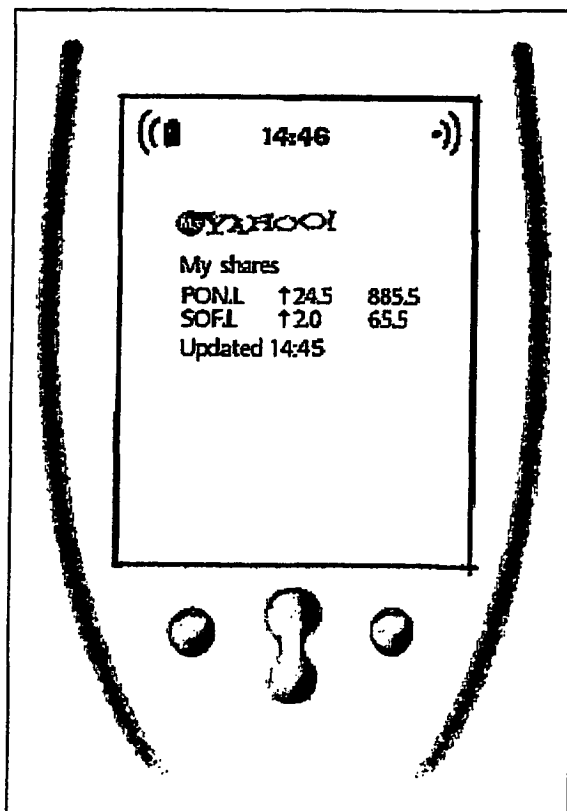


Figure 7

6/13

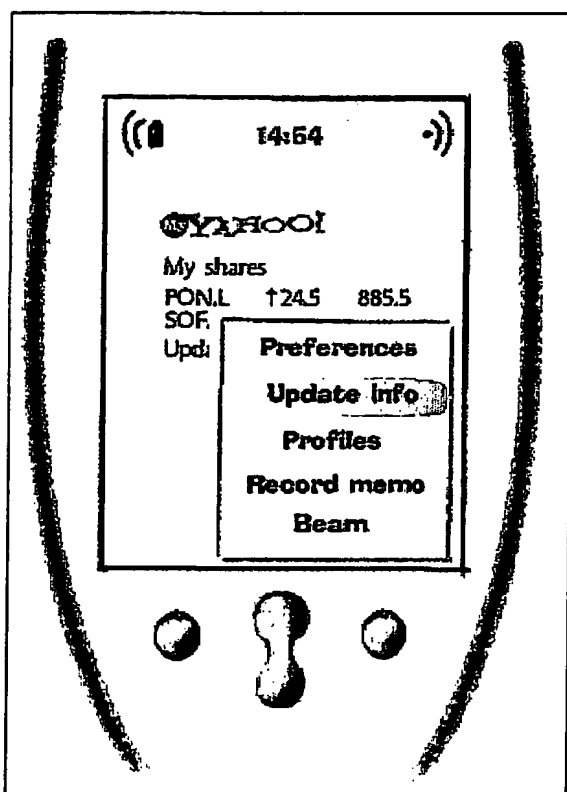


Figure 8A

7/13

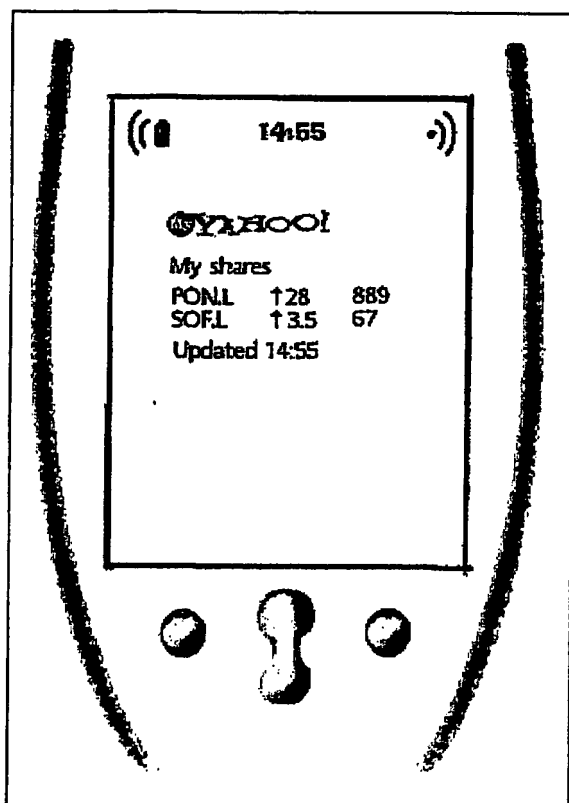


Figure 8B

8/13

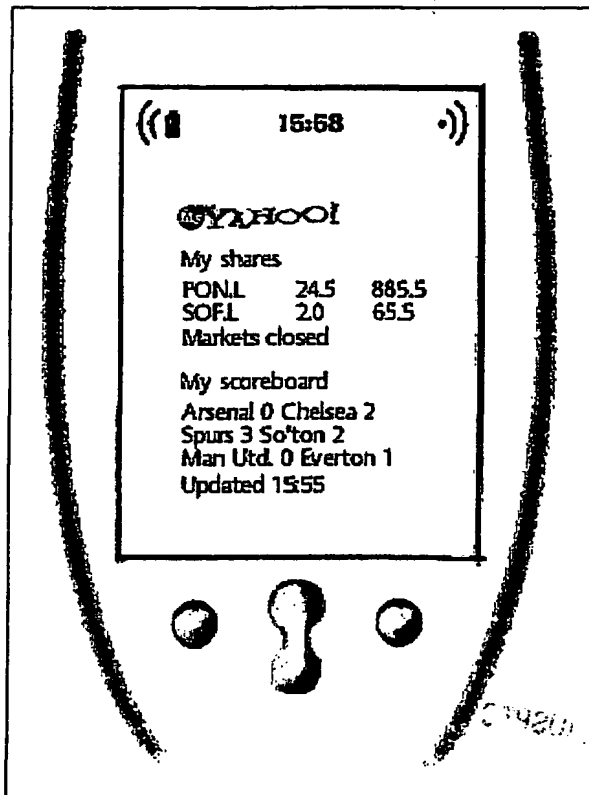


Figure 9

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9/13

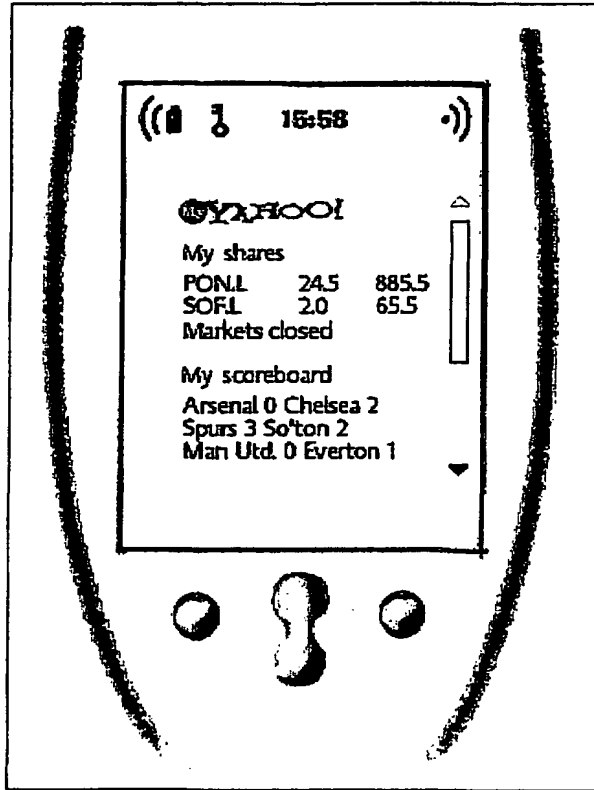


Figure 10A

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10/13

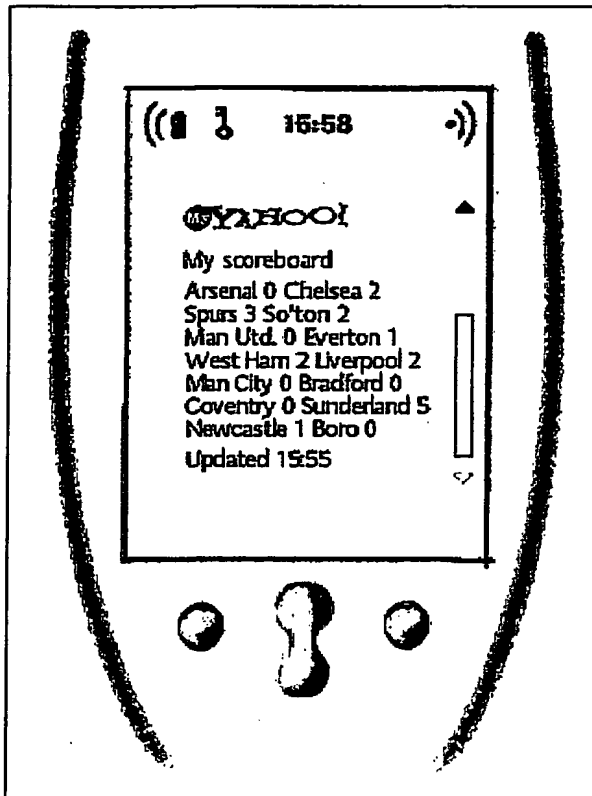


Figure 10B

11/13

Figure 11A

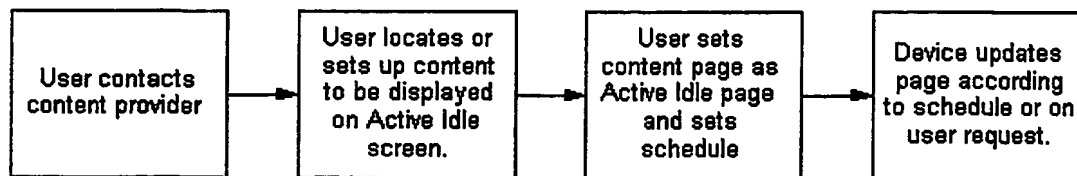
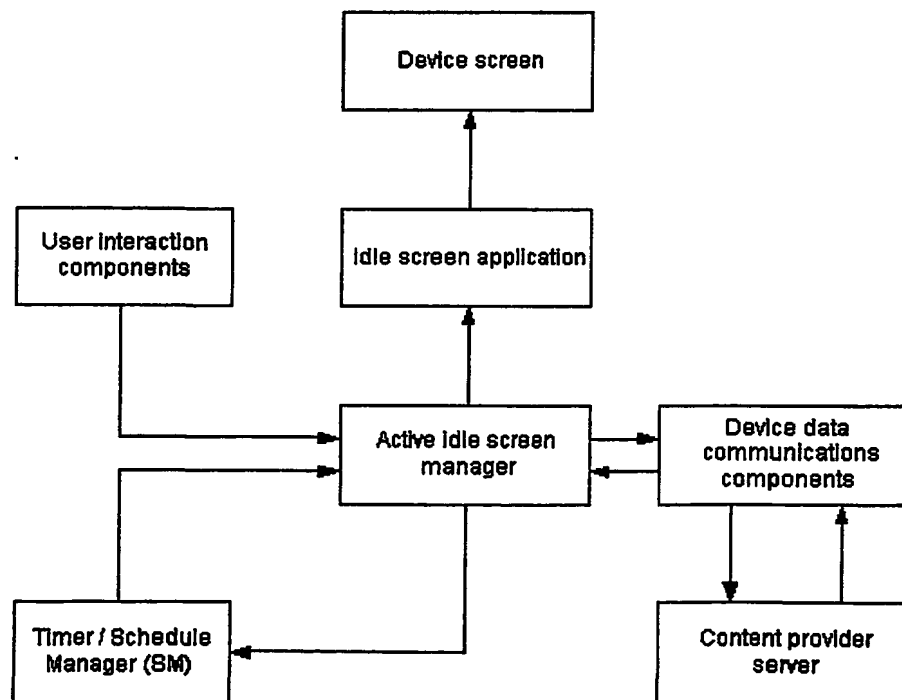
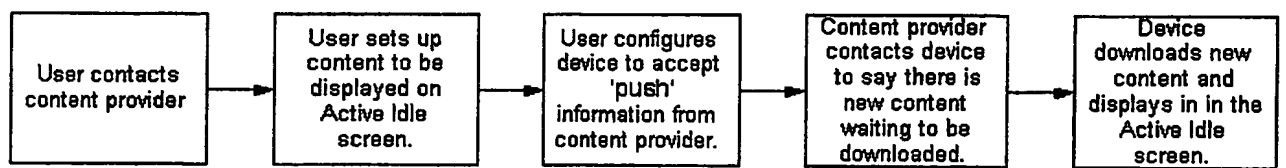
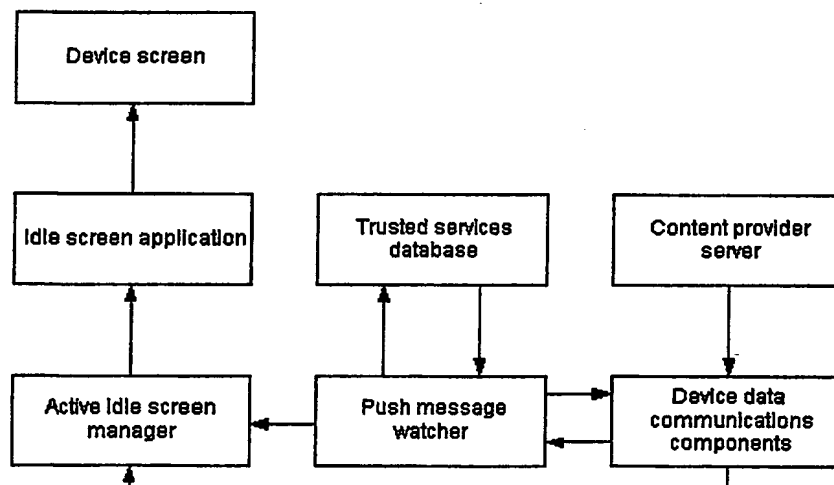
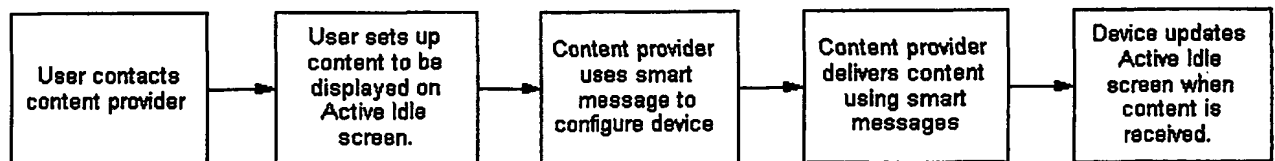
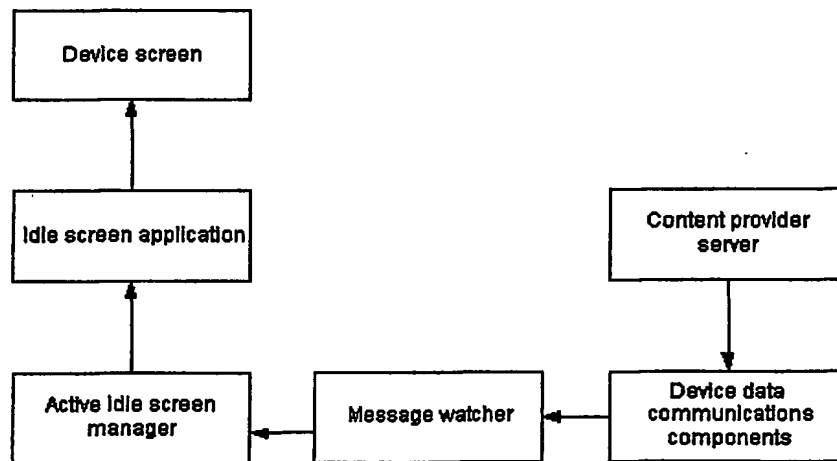
**Overall flow: WAP/Web pull model****Mechanisms involved in updating process**

Figure 11B

12/13

**Figure 12A****Overall flow: WAP-push model****Mechanisms involved in the update process: WAP-push model****Figure 12B**

13/13

**Figure 13A****Overall flow: message-based model****Mechanisms involved in the update process: message-based model****Figure 13B**

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